NEW MEXICO
ENVIRONMENT DEPARTMENT

Ground Water Quality Bureau

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SUSANA MARTINEZ
Governor

JOHN A. SANCHEZ
Lieutenant Governor

DAVE MARTIN
Secretary

RAJ SOLOMON, P.E.
Deputy Secretary

February 28, 2011

(b) (6)

RE: Analytical results for samples collected by the New Mexico Environment Department within the Grants Mining District (CERCLIS ID NMN00060684)

Dear (b) (6) :

The New Mexico Environment Department (NMED) Superfund Oversight Section (SOS) is conducting a Phase 2 Site Investigation (SI) of the San Mateo Creek Basin Legacy Uranium Site (Site) in Cibola and McKinley counties, New Mexico. This project is investigating possible environmental impacts from legacy uranium mines and mills within the Grants Mining District.

Ground water contaminants that may be associated with the Site, as derived from historical documentation, include radium$_{226+228}$, uranium, nitrate, chloride, molybdenum, selenium, magnesium, thorium, aluminum, manganese, and iron. To better understand ground water conditions in the area of the Site, and to identify potential risks to public health from consumption of ground water that may be impacted by the Site, samples were collected from area wells as part of the SI. Well water sampling was conducted by NMED November 8 and 9, 2010. Water samples were collected from your two private wells. The samples were analyzed for major ions, metals (total and dissolved), nitrate plus nitrite, and radioactivity.

Please see the enclosed documents for information on the results from the sample collected from your well, which include:

- A summary comparing selected analytical results from your well to federal and state drinking water, and state ground water quality standards.
- Toxicological fact sheets for analytes of interest identified in sample from your well that exceed standards.

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- Copies of the original laboratory analytical results for samples from your well.
- Federal Drinking Water Quality Standards and State of New Mexico Water Quality Control Commission Standards.
- "Health advisory for private wells within the San Mateo Creek basin" (NMED, January 7, 2009).

Due to the exceedance of the gross alpha and radioactivity (e.g. radium-226 plus radium-228) health-based primary Maximum Contaminant Levels (MCLs) in the sample designated GMD-04, NMED recommends that you do not consume water from the well from which this sample was collected without treatment to reduce or remove the concentrations of these contaminants.

Thank you for your participation in the well sampling program. NMED is continuing to review information and investigate ground water quality in the area. NMED may contact well owners for permission to conduct follow-up or confirmatory well sampling as necessary.

Please contact me at (505) 827-2908 if you have any questions or require additional information, or you may contact the New Mexico Department of Health, Epidemiology and Response Division at (800) 879-3421 (toll-free) or (505) 827-0006 for more information about the potential health effects of ground water contaminants.

Sincerely,

Dana Bahar
Superfund Oversight Section

Enclosures: "Selected analyte concentrations in comparison to regulatory standards"
Laboratory analytical results
ATSDR or EPA contaminant fact sheets
Federal Drinking Water Quality Standards
State of New Mexico Water Quality Control Commission Standards
"Health advisory for private wells within the San Mateo Creek Basin"

xc w/o enc: Grants Mining District correspondence file
SOS Read File

Selected analyte concentrations in comparison to regulatory standards

SAMPLE NAME	ANALYTE	RESULT	MCL drinking water standard*	NMWQCC ground water standard***	UNITS
GMD-04+	gross alpha	**17.3 ± 4.01**	15**	NS	pCi/l
	Radioactivity ($radium_{226}$ + $radium_{228}$)	**6.0** (3.33 ± 1.15 plus 2.67 ± 0.75)	5**	30	pCi/l
	total manganese	68.1	50	NS	µg/l
	sulfate	270	250	600	mg/l
	total dissolved solids (TDS)	709	500	1000	mg/l
GMD-05++	chloride	1500	250	250+++	mg/l
	sulfate	280	250	600	mg/l
	TDS	3070	500	1000	mg/l

NS=no standard established
µg/l=micrograms/liter (=1/1000 mg/l)
mg/l=milligrams/liter
pCi/l=picocuries/liter
Bolded entries indicate concentrations that exceed a health-based primary Maximum Contaminant Level (MCL)
Unbolded entries indicate concentrations that exceed a non-enforceable secondary or aesthetic MCL.

* MCLs are established by the EPA for public drinking water systems, and have been adopted by the State of New Mexico as well. For metal contaminants, these standards apply to the total metal concentrations.
**These MCLs are primary enforceable standards that apply to public water systems. Primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in water.
***These standards are established by the New Mexico Water Quality Control Commission (NMWQCC) and are applicable to ground water with 10,000 milligrams/liter ("mg/l") or less of total dissolved solids. For metal contaminants, these standards apply to dissolved metal concentrations.
+This sample was taken from your currently-used residential well
++This sample was taken from your currently-unused well.
+++This NMWQCC standard applies to domestic water supply

Environmental Protection Agency
Region 6 Laboratory
10625 Fallstone Road, Houston, TX 77099
Phone:(281)983-2100 Fax:(281)983-2248

Metals by CLP ILMO5.3 - ICP

Lab ID: 1011019-05 **Station ID: GMD-04**

Batch: B0K2305 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aluminum (7429-90-5)	U		100	1	11/24/10	12/02/10
Barium (7440-39-3)	**69.3**		10.0	"	"	"
Beryllium (7440-41-7)	U		5.0	"	"	"
Cadmium (7440-43-9)	U		5.0	"	"	"
Calcium (7440-70-2)	**104,000**		150	"	"	"
Chromium (7440-47-3)	U		10.0	"	"	"
Cobalt (7440-48-4)	U		20.0	"	"	"
Copper (7440-50-8)	U		20.0	"	"	"
Iron (7439-89-6)	**79.3**		25.0	"	"	"
Magnesium (7439-95-4)	**21,300**		150	"	"	"
Manganese (7439-96-5)	**68.1**		5.0	"	"	"
Nickel (7440-02-2)	U		20.0	"	"	"
Potassium (7440-09-7)	**4,110**		1,000	"	"	"
Silver (7440-22-4)	U		10.0	"	"	"
Sodium (7440-23-5)	**104,000**		500	"	"	"
Vanadium (7440-62-2)	U		20.0	"	"	"
Zinc (7440-66-6)	**474**		20.0	"	"	"

Metals by CLP ILMO5.3 - ICP/MS

Lab ID: 1011019-05 **Station ID: GMD-04**

Batch: B0K2306 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Antimony (7440-36-0)	U		2.0	4	11/29/10	12/02/10
Arsenic (7440-38-2)	U		2.0	"	"	"
Lead (7439-92-1)	U		2.0	"	"	"
Molybdenum (7439-98-7)	U		4.0	"	"	"
Selenium (7782-49-2)	U		2.0	"	"	"
Thallium (7440-28-0)	U		2.0	"	"	"
Uranium (7440-61-1)	**3.0**		2.0	"	"	"

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Metals by CLP ILMO5.3 - CVAAS

Lab ID: 1011019-05 **Station ID: GMD-04**

Batch: B0K2302 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 25 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Mercury (7439-97-6)	U		0.200	1	11/23/10	11/23/10

Metals (Dissolved) by CLP ILMO5.3 - ICP

Lab ID: 1011019-05 **Station ID: GMD-04**

Batch: B0K2305 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aluminum (7429-90-5)	U		100	1	11/24/10	12/02/10
Barium (7440-39-3)	**67.0**		10.0	"	"	"
Beryllium (7440-41-7)	U		5.0	"	"	"
Cadmium (7440-43-9)	U		5.0	"	"	"
Calcium (7440-70-2)	**100,000**		150	"	"	"
Chromium (7440-47-3)	U		10.0	"	"	"
Cobalt (7440-48-4)	U		20.0	"	"	"
Copper (7440-50-8)	U		20.0	"	"	"
Iron (7439-89-6)	**71.3**		25.0	"	"	"
Magnesium (7439-95-4)	**20,500**		150	"	"	"
Manganese (7439-96-5)	**65.7**		5.0	"	"	"
Nickel (7440-02-2)	U		20.0	"	"	"
Potassium (7440-09-7)	**3,920**		1,000	"	"	"
Silver (7440-22-4)	U		10.0	"	"	"
Sodium (7440-23-5)	**99,800**		500	"	"	"
Vanadium (7440-62-2)	U		20.0	"	"	"
Zinc (7440-66-6)	**432**		20.0	"	"	"

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Metals (Dissolved) by CLP ILMO5.3 - ICP/MS

Lab ID: 1011019-05 **Station ID: GMD-04**

Batch: B0K2306 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Antimony (7440-36-0)	U		2.0	4	11/29/10	12/02/10
Arsenic (7440-38-2)	U		2.0	"	"	"
Lead (7439-92-1)	U		2.0	"	"	"
Molybdenum (7439-98-7)	U		4.0	"	"	"
Selenium (7782-49-2)	U		2.0	"	"	"
Thallium (7440-28-0)	U		2.0	"	"	"
Uranium (7440-61-1)	**3.0**		2.0	"	"	"

Metals (Dissolved) by CLP ILMO5.3 - CVAAS

Lab ID: 1011019-05 **Station ID: GMD-04**

Batch: B0K2302 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 25 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Mercury (7439-97-6)	U		0.200	1	11/23/10	11/23/10

pH by EPA Method 150.1

Lab ID: 1011019-05 **Station ID: GMD-04**

Batch: B0K1004 Date Collected: 11/08/10
Sample Type: Liquid Sample Qualifiers:

Targets

Analyte (CAS Number)	Result pH Units	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
pH (C-006)	**7.4**			1	11/11/10	11/11/10

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Metals by CLP ILMO5.3 - ICP

Lab ID: 1011019-06 **Station ID: GMD-05**

Batch: B0K2305 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aluminum (7429-90-5)	U		100	1	11/24/10	12/02/10
Barium (7440-39-3)	**99.9**		10.0	"	"	"
Beryllium (7440-41-7)	U		5.0	"	"	"
Cadmium (7440-43-9)	U		5.0	"	"	"
Calcium (7440-70-2)	**16,600**		150	"	"	"
Chromium (7440-47-3)	U		10.0	"	"	"
Cobalt (7440-48-4)	U		20.0	"	"	"
Copper (7440-50-8)	U		20.0	"	"	"
Iron (7439-89-6)	**33.8**		25.0	"	"	"
Magnesium (7439-95-4)	**4,610**		150	"	"	"
Manganese (7439-96-5)	**13.8**		5.0	"	"	"
Nickel (7440-02-2)	U		20.0	"	"	"
Potassium (7440-09-7)	**4,540**		1,000	"	"	"
Silver (7440-22-4)	U		10.0	"	"	"
Sodium (7440-23-5)	**1,080,000**		1,500	3	"	12/03/10
Vanadium (7440-62-2)	U		20.0	1	"	12/02/10
Zinc (7440-66-6)	U		20.0	"	"	"

Metals by CLP ILMO5.3 - ICP/MS

Lab ID: 1011019-06 **Station ID: GMD-05**

Batch: B0K2306 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Antimony (7440-36-0)	U		2.0	4	11/29/10	12/02/10
Arsenic (7440-38-2)	U		2.0	"	"	"
Lead (7439-92-1)	U		2.0	"	"	"
Molybdenum (7439-98-7)	U		4.0	"	"	"
Selenium (7782-49-2)	**5.8**		2.0	"	"	"
Thallium (7440-28-0)	U		2.0	"	"	"
Uranium (7440-61-1)	U		2.0	"	"	"

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Metals by CLP ILMO5.3 - CVAAS

Lab ID: 1011019-06 **Station ID: GMD-05**

Batch: B0K2302 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 25 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Mercury (7439-97-6)	U		0.200	1	11/23/10	11/23/10

Metals (Dissolved) by CLP ILMO5.3 - ICP

Lab ID: 1011019-06 **Station ID: GMD-05**

Batch: B0K2305 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Aluminum (7429-90-5)	U		100	1	11/24/10	12/02/10
Barium (7440-39-3)	**106**		10.0	"	"	"
Beryllium (7440-41-7)	U		5.0	"	"	"
Cadmium (7440-43-9)	U		5.0	"	"	"
Calcium (7440-70-2)	**17,600**		150	"	"	"
Chromium (7440-47-3)	U		10.0	"	"	"
Cobalt (7440-48-4)	U		20.0	"	"	"
Copper (7440-50-8)	U		20.0	"	"	"
Iron (7439-89-6)	U		25.0	"	"	"
Magnesium (7439-95-4)	**4,890**		150	"	"	"
Manganese (7439-96-5)	**11.4**		5.0	"	"	"
Nickel (7440-02-2)	U		20.0	"	"	"
Potassium (7440-09-7)	**7,220**		1,000	"	"	"
Silver (7440-22-4)	U		10.0	"	"	"
Sodium (7440-23-5)	**1,160,000**		1,500	3	"	12/03/10
Vanadium (7440-62-2)	U		20.0	1	"	12/02/10
Zinc (7440-66-6)	U		20.0	"	"	"

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Metals (Dissolved) by CLP ILMO5.3 - ICP/MS

Lab ID: 1011019-06 **Station ID: GMD-05**

Batch: B0K2306 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 50 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Antimony (7440-36-0)	U		2.0	4	11/29/10	12/02/10
Arsenic (7440-38-2)	U		2.0	"	"	"
Lead (7439-92-1)	U		2.0	"	"	"
Molybdenum (7439-98-7)	U		4.0	"	"	"
Selenium (7782-49-2)	**6.6**		2.0	"	"	"
Thallium (7440-28-0)	U		2.0	"	"	"
Uranium (7440-61-1)	U		2.0	"	"	"

Metals (Dissolved) by CLP ILMO5.3 - CVAAS

Lab ID: 1011019-06 **Station ID: GMD-05**

Batch: B0K2302 Date Collected: 11/08/10
Sample Type: Liquid Sample Volume: 25 ml Sample Qualifiers:

Targets

Analyte (CAS Number)	Result µg/l	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
Mercury (7439-97-6)	U		0.200	1	11/23/10	11/23/10

pH by EPA Method 150.1

Lab ID: 1011019-06 **Station ID: GMD-05**

Batch: B0K1004 Date Collected: 11/08/10
Sample Type: Liquid Sample Qualifiers:

Targets

Analyte (CAS Number)	Result pH Units	Analyte Qualifiers	Reporting Limit	Dilution	Prepared	Analyzed
pH (C-006)	**7.8**			1	11/11/10	11/11/10

Environmental Protection Agency
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Notes and Definitions

L	The identification of the analyte is acceptable; the reported value may be biased low. The actual value is expected to be greater than the reported value.
A	This sample was extracted at a single acid pH.
HTS	Sample was prepared and/or analyzed past recommended holding time. Concentrations should be considered minimum values.
AES	Atomic Emission Spectrometer
CVAA	Cold Vapor Atomic Absorption
ECD	Electron Capture Detector
GC	Gas Chromatograph
GFAA	Graphite Furnace Atomic Absorption
ICP	Inductively Coupled Plasma
MS	Mass Spectrometer
NA	Not Applicable
NPD	Nitrogen Phosphorous Detector
NR	Not Reported
TCLP	Toxicity Characteristic Leaching Procedure
U	Undetected
#	Out of QC limits

Initial pressure in air analyses is the pressure at which the canister was received in psia (pounds *per* square inch absolute pressure).

The pH reported for Volatile liquid samples was tested using a 0-14 pH indicator strip for the purpose of verifying chemical preservation.

The statistical software used for the reporting of toxicity data is ToxCalc 5.0.32, Environmental Toxicity Data Analysis System 1994-2007 Tidepool Scientific Software.

ISOTECH®
ISOTECH LABORATORIES INC

ANALYSIS REPORT

Water Analysis

Lab Number:	198792	Job Number:	14207
Submitter Sample Name:	1011679-03D / GMD-04		
Submitter Sample ID:			
Submitter Job #:			
Company:	Hall Environmental Analysis Lab,Inc		
Field or Site:	Project 1011679		
Location:			
Depth/Formation:			
Container Type:	1 Liter Plastic Bottle		
Sample Collected:	11/08/2010	Results Reported:	12/01/2010

δD of water	----------	-79.1 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-10.38 ‰ relative to VSMOW
Tritium content of water	----------	na
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

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ANALYSIS REPORT

Water Analysis

Lab Number:	198793	Job Number:	14207
Submitter Sample Name:	1011679-04D / GMD-05		
Submitter Sample ID:			
Submitter Job #:			
Company:	Hall Environmental Analysis Lab,Inc		
Field or Site:	Project 1011679		
Location:			
Depth/Formation:			
Container Type:	1 Liter Plastic Bottle		
Sample Collected:	11/08/2010	Results Reported:	12/01/2010

δD of water	----------	-91.9 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-11.82 ‰ relative to VSMOW
Tritium content of water	----------	na
$\delta^{13}C$ of DIC	----------	na
^{14}C content of DIC	----------	na
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na

Remarks:

Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

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QUALIFIERS

Project: 1011679
Pace Project No.: 3037552

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty

(MDC) - Minimum Detectable Concentration

Pace Analytical is NELAP accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

Pace Analytical
www.pacelabs.com

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Pace Analytical Services, Inc.
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

ANALYTICAL RESULTS

Project: 1011679
Pace Project No.: 3037552

Sample: 1011679-01C/GMD-00 **Lab ID: 3037552001** Collected: 11/08/10 09:23 Received: 11/19/10 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0m	-0.132 ± 0.346 (0.768)	pCi/L	11/29/10 14:43	12587-46-1	
Gross Beta	EPA 900.0m	0.0746 ± 0.388 (0.775)	pCi/L	11/29/10 14:43	12587-47-2	
Radium-226	EPA 903.1	-0.209 ± 0.240 (0.752)	pCi/L	12/08/10 13:29	13982-63-3	
Radium-228	EPA 904.0	-0.893 ± 0.414 (0.962)	pCi/L	12/07/10 16:58	15262-20-1	
Uranium-234	HSL-300m	-0.093 ± 0.098 (0.414)		12/03/10 18:53	13966-29-5	
Uranium-235	HSL-300m	0.047 ± 0.127 (0.127)		12/03/10 18:53	15117-96-1	
Uranium-238	HSL-300m	-0.017 ± 0.097 (0.213)		12/03/10 18:53	7440-61-1	

Sample: 1011679-02C/GMD-01 **Lab ID: 3037552002** Collected: 11/08/10 09:55 Received: 11/19/10 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0m	1.28 ± 0.767 (1.13)	pCi/L	11/28/10 16:50	12587-46-1	
Gross Beta	EPA 900.0m	3.00 ± 0.877 (0.996)	pCi/L	11/28/10 16:50	12587-47-2	
Radium-226	EPA 903.1	-0.070 ± 0.238 (0.650)	pCi/L	12/08/10 13:29	13982-63-3	
Radium-228	EPA 904.0	0.818 ± 0.518 (0.979)	pCi/L	12/07/10 17:11	15262-20-1	
Uranium-234	HSL-300m	1.598 ± 0.552 (0.311)		12/03/10 18:53	13966-29-5	
Uranium-235	HSL-300m	0.147 ± 0.168 (0.133)		12/03/10 18:53	15117-96-1	
Uranium-238	HSL-300m	0.864 ± 0.387 (0.272)		12/03/10 18:53	7440-61-1	

Sample: 1011679-03C/GMD-04 **Lab ID: 3037552003** Collected: 11/08/10 13:35 Received: 11/19/10 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Gross Alpha	EPA 900.0m	17.3 ± 4.01 (3.04)	pCi/L	11/28/10 16:51	12587-46-1	
Gross Beta	EPA 900.0m	7.23 ± 1.80 (1.71)	pCi/L	11/28/10 16:51	12587-47-2	
Radium-226	EPA 903.1	3.33 ± 1.15 (0.522)	pCi/L	12/08/10 13:29	13982-63-3	
Radium-228	EPA 904.0	2.67 ± 0.750 (0.887)	pCi/L	12/07/10 16:58	15262-20-1	
Uranium-234	HSL-300m	1.255 ± 0.476 (0.319)		12/03/10 18:54	13966-29-5	
Uranium-235	HSL-300m	0.036 ± 0.129 (0.238)		12/03/10 18:54	15117-96-1	
Uranium-238	HSL-300m	0.877 ± 0.385 (0.265)		12/03/10 18:54	7440-61-1	

Sample: 1011679-04C/GMD-05 **Lab ID: 3037552004** Collected: 11/08/10 13:35 Received: 11/19/10 10:00 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC)	Units	Analyzed	CAS No.	Qual
Gross Alpha	SM 7110C	1.33 ± 1.46 (2.67)	pCi/L	12/07/10 20:41	12587-46-1	
Gross Beta	EPA 900.0m	6.11 ± 4.23 (6.72)	pCi/L	11/28/10 16:58	12587-47-2	
Radium-226	EPA 903.1	1.05 ± 0.714 (0.866)	pCi/L	12/08/10 13:41	13982-63-3	
Radium-228	EPA 904.0	1.39 ± 0.569 (0.938)	pCi/L	12/07/10 16:58	15262-20-1	
Uranium-234	HSL-300m	0.106 ± 0.146 (0.248)		12/03/10 18:54	13966-29-5	
Uranium-235	HSL-300m	-0.013 ± 0.148 (0.272)		12/03/10 18:54	15117-96-1	
Uranium-238	HSL-300m	0.012 ± 0.113 (0.278)		12/03/10 18:54	7440-61-1	

Hall Environmental Analysis Laboratory, Inc.

Date: *15-Dec-10*

CLIENT:	NMED	**Client Sample ID:**	GMD-04
Lab Order:	1011679	**Collection Date:**	11/8/2010 1:35:00 PM
Project:	Grants Mining District	**Date Received:**	11/17/2010
Lab ID:	1011679-03	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SRM**
Chloride	19	10		mg/L	20	11/30/2010 1:12:24 PM
Nitrate (As N)+Nitrite (As N)	ND	1.0		mg/L	5	12/6/2010 9:11:10 PM
Sulfate	270	10		mg/L	20	11/30/2010 1:12:24 PM
SM 2320B: ALKALINITY						Analyst: **IC**
Alkalinity, Total (As CaCO3)	270	20		mg/L CaCO3	1	11/18/2010 5:55:00 PM
Carbonate	ND	2.0		mg/L CaCO3	1	11/18/2010 5:55:00 PM
Bicarbonate	270	20		mg/L CaCO3	1	11/18/2010 5:55:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	709	20.0	H	mg/L	1	11/22/2010 4:45:00 AM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Date: *15-Dec-10*

CLIENT:	NMED	**Client Sample ID:**	GMD-05
Lab Order:	1011679	**Collection Date:**	11/8/2010 1:35:00 PM
Project:	Grants Mining District	**Date Received:**	11/17/2010
Lab ID:	1011679-04	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: **SRM**
Chloride	1500	100		mg/L	200	11/30/2010 10:10:34 PM
Nitrate (As N)+Nitrite (As N)	ND	4.0		mg/L	20	11/30/2010 10:55:29 PM
Sulfate	280	10		mg/L	20	11/30/2010 1:29:49 PM
SM 2320B: ALKALINITY						Analyst: **IC**
Alkalinity, Total (As CaCO3)	390	20		mg/L CaCO3	1	11/18/2010 6:08:00 PM
Carbonate	ND	2.0		mg/L CaCO3	1	11/18/2010 6:08:00 PM
Bicarbonate	390	20		mg/L CaCO3	1	11/18/2010 6:08:00 PM
SM2540C MOD: TOTAL DISSOLVED SOLIDS						Analyst: **KS**
Total Dissolved Solids	3070	20.0	H	mg/L	1	11/22/2010 4:45:00 AM

Qualifiers:

*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
NC	Non-Chlorinated	ND	Not Detected at the Reporting Limit
PQL	Practical Quantitation Limit	S	Spike recovery outside accepted recovery limits

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REPORT OF RADIOCARBON DATING ANALYSES

Ms. Anne Thorne

Report Date: 12/3/2010

Hall Environmental Analysis Laboratory, Incorporated

Material Received: 11/18/2010

Sample Data	Apparent C14 Age (fraction modern)	C13/C12 Ratio
Beta - 288363	5150 +/- 40 BP (Fmdn 0.5267 +/- 0.0026)	-19.7 o/oo

SAMPLE : 1011679-01E
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation

Beta - 288364	890 +/- 40 BP (Fmdn 0.8951 +/- 0.0043)	-11.4 o/oo

SAMPLE : 1011679-02E
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation

Beta - 288365	3690 +/- 50 BP (Fmdn 0.6317 +/- 0.0038)	-10.1 o/oo

GMD-04 (b) (6)

SAMPLE : 1011679-03E
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation

Beta - 288366	28170 +/- 130 BP (Fmdn 0.0300 +/- 0.0005)	-11.5 o/oo

GMD-05 (b) (6)

SAMPLE : 1011679-04E
ANALYSIS : AMS-Standard delivery
MATERIAL/PRETREATMENT : (water DIC): carbonate precipitation

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the 14C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby 14C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured 13C/12C ratios (delta 13C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta 13C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta 13C, the ratio and the Conventional Radiocarbon Age will be followed by "#". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

EPA United States Environmental Protection Agency

Basic Information about Regulated Drinking Water Contaminants

Basic Information about Radionuclides in Drinking Water

The United States Environmental Protection Agency (EPA) regulates radionuclides in drinking water to protect public health. Radionuclides may cause health problems if present in public or private water supplies in amounts greater than the drinking water standard set by EPA.

What are radionuclides?

A radionuclide is an atom with an unstable nucleus which, to become more stable, emits energy in the form of rays or high speed particles. This is called ionizing radiation because it can create "ions" by displacing electrons in the body e.g. in the DNA, disrupting its function. The three major types of ionizing radiation are: alpha particles, beta particles and gamma rays.

Approximately 80% of our exposure to radioactivity is natural and another 20% is from man made sources, although more frequent use of diagnostic imaging involving radiation (x-rays, CT scans) is increasing exposure from this source. We are exposed to naturaly occurring radiation for example from radon gas emanating from rocks and soil, and cosmic radiation from space. We also carry small amounts of potassium-40 in our bodies from the foods containing potassium. Depending on the type of rocks where you live, 55 to 70% of natural exposure comes from radon gas, while cosmic radiation (which is greater at higher altitude) represents about 11%, and potassium-40 about 5%. Radiation may exist in drinking water from nuclides dissolved in the water from natural sources in the earth or occasionally from releases from laboratories or nuclear power plants.[1]

EPA regulates the following radionuclides in drinking water: (Adjusted) Gross Alpha Emitters, Beta Particle and Photon (gamma) Radioactivity, Radium 226 and Radium 228 (Combined) and Uranium.

Uses for radionuclides.

Radionuclides have properties which can be valuable in a number of applications. Some radioactive elements have uses in nuclear medicine for diagnosis treatment or research. Tracers such as iodine-131 (I-131) follow the uptake of an element such as iodine into the thyroid. Other radioisotopes such as bismuth-212 (an alpha particle emitter) are used to kill cancer cells. Others like technetium-99 highlight an area of the body so it can be seen more clearly during imaging. Nuclear reactors utilize the heat of radioactive decay of uranium (U-235) to produce steam which turns turbines to generate electric power. Americium-241 is used in smoke detectors, and cobalt-60 and cesium-137 are gamma (photon) sources used to kill pathogens and insects in food.

What are radionuclides' health effects?

Contaminant	Health Effect
Combined radium-226/-228	Some people who drink water containing radium 226 or radium 228 in excess of the MCL over many years may have an increased risk of getting cancer.
(Adjusted) Gross Alpha	Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.
Beta Particle and Photon Radioactivity	Some people who drink water containing beta particles and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.
Uranium	Exposure to uranium in drinking water may result in toxic effects to the kidney. Some people who drink water containing alpha emitters, such as uranium, in excess of the MCL over many years may have an increased risk of getting cancer.

This health effects language is not intended to catalog all possible health effects for radionuclides. Rather, it is intended to inform consumers of the most significant and probable health effects, associated with radionuclides in drinking water.

What are EPA's drinking water regulations for radionuclides?

In 1974, Congress passed the Safe Drinking Water Act. This law requires EPA to determine the level of contaminants in drinking water at which no adverse health effects are likely to occur. These non-enforceable health goals, based solely on possible health risks and exposure over a lifetime with an adequate margin of safety, are called maximum contaminant level goals (MCLG). Contaminants are any physical, chemical, biological or radiological substances or matter in water.

EPA sets the enforceable regulation, called a maximum contaminant level (MCL), as close to the health goals (the MCLG) as possible, considering cost, benefits and the ability of public water systems to detect and remove contaminants using suitable treatment technologies.

The regulations for radionuclides are in the table below.

Radionuclides	MCLG	MCL
(Adjusted) Gross Alpha Emitters	Zero	15 picoCuries per liter
Beta Particle and Photon Radioactivity	Zero	4 millirems per year

Radionuclides	MCLG	MCL
Radium 226 and Radium 228 (Combined)	Zero	5 picoCuries per liter
Uranium	Zero	30 micrograms per liter

The National Primary Drinking Water Regulations for radionuclides became effective in 1977 and were last revised in 2000 to include uranium. The Safe Drinking Water Act requires EPA to periodically review the regulation for each contaminant and revise it, if appropriate. EPA will review the radionuclides regulation again in 2015 or sooner if important information becomes available.

- More information on the Six Year Review of Drinking Water Standards.

States may set more stringent drinking water MCLGs and MCLs for radionuclides than EPA.

How do radionuclidesget into my drinking water?
Certain rock types have naturally occurring trace amounts of "mildly radioactive" elements (radioactive elements with very long half-lives) that serve as the "parent" of other radioactive contaminants ("daughter products"). These radioactive contaminants, depending on their chemical properties, may accumulate in drinking water sources at levels of concern. The "parent radionuclide" often behaves very differently from the new element, the "daughter radionuclide" in the environment.

A federal law called the Emergency Planning and Community Right to Know Act (EPCRA) requires facilities in certain industries, which manufacture, process, or use significant amounts of toxic chemicals, to report annually on their releases of these chemicals. For more information on the uses and releases of chemicals in your state, contact the: Community Right-to-Know Hotline: (800) 424-9346.

- EPA's Toxics Release Inventory (TRI) Web site provides information about the types and amounts of toxic chemicals that are released each year to the air, water, and land.

How will I know if radionuclides are in my drinking water?
When routine monitoring indicates that radionuclideslevels are above the MCL, your water supplier must take steps to reduce the amount of radionuclidesso that it is below that level. Water suppliers must notify their customers as soon as practical or within 30 days after a violation occurs. Additional actions, such as providing alternative drinking water supplies, may be required to decrease risks to public health.

- See EPA's public notification requirements for public water systems.

If your water comes from a household well, check with your health department or local water systems that use ground water for information on contaminants of concern in your area.

- For more information on wells, go to EPA's Web site on private wells.

How will radionuclides be removed from my drinking water?
The following treatment method(s) have proven to be effective in removing radionuclides at levels below their MCLs:

- Beta particle and Photon Radiation: ion exchange and reverse osmosis;
- (Gross) Alpha Emitters: reverse osmosis;
- Radium 226 and Radium 228 (Combined): ion exchange, reverse osmosis, lime softening;
- Uranium: Ion exchange, reverse osmosis, lime softening, coagulation/filtration.

How do I learn more about my drinking water?
EPA strongly encourages people to learn more about their drinking water, and to support local efforts to protect and upgrade the supply of safe drinking water. Your water bill or telephone book's government listings are a good starting point for local information.

Contact your water utility. EPA requires all community water systems to prepare and deliver an annual consumer confidence report (CCR) (sometimes called a water quality report) for their customers by July 1 of each year. If your water provider is not a community water system, or if you have a private water supply, request a copy from a nearby community water system.

- The CCR summarizes information regarding sources used (i.e., rivers, lakes, reservoirs, or aquifers), detected contaminants, compliance and educational information.
- Some water suppliers have posted their annual reports on EPA's Web site.

Other EPA Web sites

- Find an answer or ask a question about drinking water contaminants on EPA's Question and Answer Web site or call EPA's Safe Drinking Water Hotline at (800) 426-47911
- Understanding Radiation
- Radionuclides in drinking water
- Technology Transfer Network, Radionuclides (Including Radon, Radium and Radionuclides)
- Radiation Protection: Uranium

Other Federal Departments and Agencies

- Agency for Toxic substances and Disease Registry, Radium ToxFAQs

[1] Radiation: Risks and Realities. Understanding Radiation in Your Life, Your World PDF (16pp, 1M) http://water.epa.gov/drink/contaminants/basicinformation/radionuclides.cfm

Last updated on Monday, June 14, 2010.

EPA United States Environmental Protection Agency

Drinking Water Contaminants

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Drinking Water Contaminants

National Primary Drinking Water Regulations

National Primary Drinking Water Regulations (NPDWRs or primary standards) are legally enforceable standards that apply to public water systems. Primary standards protect public health by limiting the levels of contaminants in drinking water. Visit the list of regulated contaminants with links for more details.

- List of Contaminants & their Maximum Contaminant Level (MCLs)
- Regulation Development
- EPA's Regulated Contaminant Timeline (PDF) (1 pp, 86 K) (About PDF)
- National Primary Drinking Water Regulations- The complete regulations regarding these contaminants availible from the Code of Federal Regulations Website

List of Contaminants & their MCLs

An alphabetical listing with links to fact sheets on the primary drinking water regulations.

- Microorganisms
- Disinfectants
- Disinfection Byproducts
- Inorganic Chemicals
- Organic Chemicals
- Radionuclides

On this Page

Information on this section

- Alphabetical List (PDF) (6 pp, 924 K) (About PDF) EPA 816-F-09-0004, May 2009

Microorganisms

Contaminant	MCLG (mg/L)[1][2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Cryptosporidium	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste
Giardia lamblia	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste
Heterotrophic plate count	n/a	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment
Legionella	zero	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems
Total Coliforms (including fecal coliform and *E. Coli*)	zero	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Coliforms are naturally present in the environment; as well as feces; fecal coliforms and *E. coli* only come from human and animal fecal waste.
Turbidity	n/a	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff
Viruses (enteric)	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste

Disinfection Byproducts

Contaminant	MCLG [1] (mg/L) [2]	MCL or TT [1] (mg/L) [2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Bromate	zero	0.010	Increased risk of cancer	Byproduct of drinking water disinfection
Chlorite	0.8	1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection
Haloacetic acids (HAA5)	n/a [6]	0.060 [7]	Increased risk of cancer	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs)	--> n/a [6]	--> 0.080 [7]	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection

Disinfectants

Contaminant	MCLG [1] (mg/L) [2]	MCL or TT [1] (mg/L) [2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Chloramines (as Cl_2)	MRDLG=4 [1]	MRDL=4.0 [1]	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes
Chlorine (as Cl_2)	MRDLG=4 [1]	MRDL=4.0 [1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes
Chlorine dioxide (as ClO_2)	MRDLG=0.8 [1]	MRDL=0.8 [1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes

Inorganic Chemicals

Contaminant	MCLG [1] (mg/L) [2]	MCL or TT [1] (mg/L) [2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Antimony	0.006	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic	0 [7]	0.010 as of 01/23/06	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards, runoff from glass & electronicsproduction wastes
Asbestos (fiber >10 micrometers)	7 million fibers per liter	7 MFL	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits
Barium	2	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beryllium	0.004	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium	0.005	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (total)	0.1	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits
Copper	1.3	TT [7]; Action Level=1.3	Short term exposure: Gastrointestinal distress Long term exposure: Liver or kidney damage	Corrosion of household plumbing systems; erosion of natural deposits

Contaminant	MCLG [1] (mg/L) [2]	MCL or TT [1] (mg/L) [2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
			People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	
Cyanide (as free cyanide)	0.2	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories
Fluoride	4.0	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Lead	zero	TT [7]; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits
Mercury (inorganic)	0.002	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands
Nitrate (measured as Nitrogen)	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue -baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Nitrite (measured as Nitrogen)	1	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue -baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium	0.0005	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories

Organic Chemicals

Contaminant	MCLG [1] (mg/L) [2]	MCL or TT [1] (mg/L) [2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Acrylamide	zero	TT [8]	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/wastewater treatment
Alachlor	zero	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops
Atrazine	0.003	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops
Benzene	zero	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene (PAHs)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines
Carbofuran	0.04	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa

Contaminant	MCLG (mg/L)[1][2]	MCL or TT (mg/L)[1][2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Carbon tetrachloride	zero	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities
Chlordane	zero	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide
Chlorobenzene	0.1	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories
2,4-D	0.07	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops
Dalapon	0.2	0.2	Minor kidney changes	Runoff from herbicide used on rights of way
1,2-Dibromo-3-chloropropane (DBCP)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
o-Dichlorobenzene	0.6	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories
p-Dichlorobenzene	0.075	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories
1,2-Dichloroethane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
1,1-Dichloroethylene	0.007	0.007	Liver problems	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene	0.07	0.07	Liver problems	Discharge from industrial chemical factories
trans-1,2-Dichloroethylene	0.1	0.1	Liver problems	Discharge from industrial chemical factories
Dichloromethane	zero	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories
1,2-Dichloropropane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
Di(2-ethylhexyl) adipate	0.4	0.4	Weight loss, liver problems, or possible reproductive difficulties.	Discharge from chemical factories
Di(2-ethylhexyl) phthalate	zero	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories
Dinoseb	0.007	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables
Dioxin (2,3,7,8-TCDD)	zero	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories
Diquat	0.02	0.02	Cataracts	Runoff from herbicide use
Endothall	0.1	0.1	Stomach and intestinal problems	Runoff from herbicide use
Endrin	0.002	0.002	Liver problems	Residue of banned insecticide
Epichlorohydrin	zero	TT[8]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals
Ethylbenzene	0.7	0.7	Liver or kidneys problems	Discharge from petroleum refineries

Contaminant	MCLG (mg/L)[1][2]	MCL or TT (mg/L)[1][2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Ethylene dibromide	zero	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries
Glyphosate	0.7	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use
Heptachlor	zero	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide
Heptachlor epoxide	zero	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor
Hexachlorobenzene	zero	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories
Hexachlorocyclopentadiene	0.05	0.05	Kidney or stomach problems	Discharge from chemical factories
Lindane	0.0002	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	0.04	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl (Vydate)	0.2	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinated biphenyls (PCBs)	zero	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals
Pentachlorophenol	zero	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories
Picloram	0.5	0.5	Liver problems	Herbicide runoff
Simazine	0.004	0.004	Problems with blood	Herbicide runoff
Styrene	0.1	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills
Tetrachloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners
Toluene	1	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories
Toxaphene	zero	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle
2,4,5-TP (Silvex)	0.05	0.05	Liver problems	Residue of banned herbicide
1,2,4-Trichlorobenzene	0.07	0.07	Changes in adrenal glands	Discharge from textile finishing factories
1,1,1-Trichloroethane	0.20	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane	0.003	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories
Trichloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories

Contaminant	MCLG (mg/L)[1][2]	MCL or TT (mg/L)[1][2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Vinyl chloride	zero	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories
Xylenes (total)	10	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories

Radionuclides

Contaminant	MCLG (mg/L)[1][2]	MCL or TT (mg/L)[1][2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Alpha particles	none[7] ---------- zero	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters	none[7] ---------- zero	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 and Radium 228 (combined)	none[7] ---------- zero	5 pCi/L	Increased risk of cancer	Erosion of natural deposits
Uranium	zero	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits

Notes

[1] Definitions: Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals. Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards. Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants. (TT) Treatment Technique - A required process intended to reduce the level of a contaminant in drinking water. Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

[2] Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million.

[3] EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- *Cryptosporidium: Unfiltered systems are required to include Cryptosporidium in their existing watershed control provisions.*
- *Giardia lamblia: 99.9% removal/inactivation*
- Viruses: 99.99% removal/inactivation
- *Legionella: No limit, but EPA believes that if Giardia* and viruses are removed/inactivated, according to the treatment techniques in the Surface Water Treatment Rule, *Legionella* will also be controlled.
- Turbidity: For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 nephelolometric turbidity unit NTU), and samples for turbidity must be less than or equal to 0.3 NTU in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTU.
- HPC: No more than 500 bacterial colonies per milliliter.
- Long Term 1 Enhanced Surface Water Treatment: Surface water systems or (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- *Long Term 2 Enhanced Surface Water Treatment Rule This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional Cryptosporidium treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storage facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts.*
- Filter Backwash Recycling; The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

[4] *No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or E. coli* if two consecutive TC-positive samples, and one is also positive for *E.coli fecal coliforms, system has an acute MCL violation.*

5 Fecal coliform and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

6 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L); chloroform (0.07mg/L).
- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.02 mg/L); monochloroacetic acid (0.07 mg/L). Bromoacetic acid and dibromoacetic acid are regulated with this group but have no MCLGs.

7 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

8 Each water system must certify, in writing, to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows:

- Acrylamide = 0.05% dosed at 1 mg/L (or equivalent)
- Epichlorohydrin = 0.01% dosed at 20 mg/L (or equivalent)

National Secondary Drinking Water Regulations

National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

- National Secondary Drinking Water Regulations - The complete regulations regarding these contaminants available from the Code of Federal Regulations Web Site.
- For more information, read Secondary Drinking Water Regulations: Guidance for Nuisance Chemicals.

List of National Secondary Drinking Water Regulations

Contaminant	Secondary Standard
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

Unregulated Contaminants

This list of contaminants which, at the time of publication, are not subject to any proposed or promulgated national primary drinking water regulation (NPDWR), are known or anticipated to occur in public water systems, and may require regulations under SDWA. For more information check out the list, or vist the Drinking Water Contaminant Candidate List (CCL) web site.

- Drinking Water Contaminant Candidate List 2
- Drinking Water Contaminant Candidate List (CCL) Web Site
- Unregulated Contaminant Monitoring Program (UCM)
- **Information on specific unregulated contaminants**
  - MTBE (methyl-t-butyl ether) in drinking water

Last updated on Tuesday, January 11, 2011

http://water.epa.gov/drink/contaminants/index.cfm#List

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

MANGANESE

CAS # 7439-96-5

Division of Toxicology and Environmental Medicine ToxFAQs™ September 2008

This fact sheet answers the most frequently asked health questions (FAQs) about manganese. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Manganese is a trace element and eating a small amount from food or water is needed to stay healthy. Exposure to excess levels of manganese may occur from breathing air, particularly where manganese is used in manufacturing, and from drinking water and eating food. At high levels, it can cause damage to the brain. Manganese has been found in at least 869 of the 1,669 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is manganese?

Manganese is a naturally occurring metal that is found in many types of rocks. Pure manganese is silver-colored, but does not occur naturally. It combines with other substances such as oxygen, sulfur, or chlorine. Manganese occurs naturally in most foods and may be added to some foods.

Manganese is used principally in steel production to improve hardness, stiffness, and strength. It may also be used as an additive in gasoline to improve the octane rating of the gas.

What happens to manganese when it enters the environment?

- Manganese can be released to the air, soil, and water from the manufacture, use, and disposal of manganese-based products.
- Manganese cannot break down in the environment. It can only change its form or become attached to or separated from particles.
- In water, manganese tends to attach to particles in the water or settle into the sediment.
- The chemical state of manganese and the type of soil determine how fast it moves through the soil and how much is retained in the soil.
- The manganese-containing gasoline additive may degrade in the environment quickly when exposed to sunlight, releasing manganese.

How might I be exposed to manganese?

- The primary way you can be exposed to manganese is by eating food or manganese-containing nutritional supplements. Vegetarians who consume foods rich in manganese such as grains, beans and nuts, as well as heavy tea drinkers, may have a higher intake of manganese than the average person.
- Certain occupations like welding or working in a factory where steel is made may increase your chances of being exposed to high levels of manganese.
- Manganese is routinely contained in groundwater, drinking water, and soil at low levels. Drinking water containing manganese or swimming or bathing in water containing manganese may expose you to low levels of this chemical.

How can manganese affect my health?

Manganese is an essential nutrient, and eating a small amount of it each day is important to stay healthy.

The most common health problems in workers exposed to high levels of manganese involve the nervous system. These health effects include behavioral changes and other nervous system effects, which include movements that may become slow and clumsy. This combination of symptoms when sufficiently severe is referred to as "manganism". Other less severe nervous system effects such as slowed hand movements have been observed in

some workers exposed to lower concentrations in the work place.

Nervous system and reproductive effects have been observed in animals after high oral doses of manganese.

How likely is manganese to cause cancer?

The EPA concluded that existing scientific information cannot determine whether or not excess manganese can cause cancer.

How can manganese affect children?

Studies in children have suggested that extremely high levels of manganese exposure may produce undesirable effects on brain development, including changes in behavior and decreases in the ability to learn and remember. We do not know for certain that these changes were caused by manganese alone. We do not know if these changes are temporary or permanent. We do not know whether children are more sensitive than adults to the effects of manganese, but there is some indication from experiments in laboratory animals that they may be.

Studies of manganese workers have not found increases in birth defects or low birth weight in their offspring. No birth defects were observed in animals exposed to manganese.

How can families reduce the risks of exposure to manganese?

❑ Children are not likely to be exposed to harmful amounts of manganese in the diet. However, higher-than-usual amounts of manganese may be absorbed if their diet is low in iron. It is important to provide your child with a well-balanced diet.

❑ Workers exposed to high levels of airborne manganese in certain occupational settings may accumulate manganese dust on their work clothes. Manganese-contaminated work clothing should be removed before getting into your car or entering your home to help reduce the exposure hazard for yourself and your family.

Is there a medical test to determine whether I've been exposed to manganese?

Several tests are available to measure manganese in blood, urine, hair, or feces. Because manganese is normally present in our body, some is always found in tissues or fluids.

Because excess manganese is usually removed from the body within a few days, past exposures are difficult to measure with common laboratory tests.

Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to manganese in drinking water at concentrations of 1 mg/L for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has established that lifetime exposure to 0.3 mg/L manganese is not expected to cause any adverse effects.

The FDA has determined that the manganese concentration in bottled drinking water should not exceed 0.05 mg/L.

The Occupational Health and Safety Administration (OSHA) has established a ceiling limit (concentration that should not be exceeded at any time during exposure) of 5 mg/m^3 for manganese in workplace air.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Manganese (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

RADIUM
CAS # 7440-14-4

This fact sheet answers the most frequently asked health questions (FAQs) about radium. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Radium is a radioactive substance formed from the breakdown of uranium and thorium. Exposure to high levels results in an increased risk of bone, liver, and breast cancer. This chemical has been found in at least 18 of the 1,177 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is radium?

(Pronounced rā′dē-əm)

Radium is a naturally occurring silvery-white radioactive metal that can exist in several forms called isotopes. Radium is formed when uranium and thorium break down in the environment. Uranium and thorium are found in small amounts in most rocks and soil. Two of the main radium isotopes found in the environment are radium-226 and radium-228.

Radium undergoes radioactive decay. It divides into two parts—one part is called radiation and the other part is called a daughter. The daughter, like radium, is not stable, and it also divides into radiation and another daughter. The dividing of daughters continues until a stable, nonradioactive daughter is formed. During the decay process, alpha, beta, and gamma radiation are released. Alpha particles can travel only a short distance and cannot travel through your skin. Beta particles can penetrate through your skin, but they cannot go all the way through your body. Gamma radiation can go all the way through your body.

Radium has been used as a radiation source for treating cancer, in radiography of metals, and combined with other metals as a neutron source for research and radiation instrument calibration. Until the 1960s, radium was a component of the luminous paints used for watch and clock dials, intrument panels in airplanes, military instruments, and compasses.

What happens to radium when it enters the environment?

- Radium is constantly being produced by the radioactive decay of uranium and thorium.
- Radium is present at very low levels in rocks and soil and may strongly attach to those materials.
- Radium may also be found in air.
- High concentrations are found in water in some areas of the country.
- Uranium mining results in higher levels of radium in water near uranium mines.
- Radium in the soil may be absorbed by plants.
- It may concentrate in fish and other aquatic organisms.

How might I be exposed to radium?

- Everyone is exposed to low levels of radium in the air, water, and food.

- Higher levels may be found in the air near industries that burn coal or other fuels.
- It may be found at higher levels in drinking water from wells.
- Miners, particularly miners of uranium and hard rock, are exposed to higher levels of radium.
- It may also be found at radioactive waste disposal sites.

How can radium affect my health?

Radium has been shown to cause effects on the blood (anemia) and eyes (cataracts). It also has been shown to affect the teeth, causing an increase in broken teeth and cavities. Patients who were injected with radium in Germany, from 1946 to 1950, for the treatment of certain diseases including tuberculosis were significantly shorter as adults than people who were not treated.

How likely is radium to cause cancer?

Exposure to high levels of radium results in an increased incidence of bone, liver, and breast cancer. The EPA and the National Academy of Sciences, Committee on Biological Effects of Ionizing Radiation, has stated that radium is a known human carcinogen.

Is there a medical test to show whether I've been exposed to radium?

Urine tests can determine if you have been exposed to radium. Another test measures the amount of radon (a breakdown product of radium) in exhaled air. Both types of tests require special equipment and cannot be done in a doctor's office. These tests cannot tell how much radium you were exposed to, nor can they be used to predict whether you will develop harmful health effects.

Has the federal government made recommendations to protect human health?

The EPA has set a drinking water limit of 5 picocuries per liter (5 pCi/L) for radium-226 and radium-228 (combined).

The EPA has set a soil concentration limit for radium-226 in uranium and thorium mill tailings of 5 picocuries per gram (5 pCi/g) in the first 15 centimeters of soil and 15 pCi/g in deeper soil.

The federal recommendations have been updated as of July 1999.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance that can cause cancer.

CAS: Chemical Abstracts Service.

National Priorities List: A list of the nation's worst hazardous waste sites.

Picocurie (pCi): A unit used to measure the quantity of radioactive material.

rem: A unit used to measure radiation dose.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. Toxicological profile for radium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 2 GROUND AND SURFACE WATER PROTECTION

20.6.2.1 ISSUING AGENCY: Water Quality Control Commission
[12-1-95; 20.6.2.1 NMAC - Rn, 20 NMAC 6.2.I.1000, 1-15-01]

20.6.2.2 SCOPE: All persons subject to the Water Quality Act, NMSA 1978, Sections 74-6-1 et seq.
[12-1-95; 20.6.2.2 NMAC - Rn, 20 NMAC 6.2.I.1001, 1-15-01]

20.6.2.3 STATUTORY AUTHORITY: Standards and Regulations are adopted by the commission under the authority of the Water Quality Act, NMSA 1978, Sections 74-6-1 through 74-6-17.
[2-18-77, 9-20-82, 12-1-95; 20.6.2.3 NMAC - Rn, 20 NMAC 6.2.I.1002, 1-15-01]

20.6.2.4 DURATION: Permanent.
[12-1-95; 20.6.2.4 NMAC - Rn, 20 NMAC 6.2.I.1003, 1-15-01]

20.6.2.5 EFFECTIVE DATE: December 1, 1995 unless a later date is cited at the end of a section.
[12-1-95, 11-15-96; 20.6.2.5 NMAC - Rn, 20 NMAC 6.2.I.1004, 1-15-01; A, 1-15-01]

20.6.2.6 OBJECTIVE: The objective of this Part is to implement the Water Quality Act, NMSA 1978, Sections 74-6-1 et seq.
[12-1-95; 20.6.2.6 NMAC - Rn, 20 NMAC 6.2.I.1005, 1-15-01]

20.6.2.7 DEFINITIONS: Terms defined in the Water Quality Act, but not defined in this part, will have the meaning given in the act. As used in this part:

A. "abandoned well" means a well whose use has been permanently discontinued or which is in a state of disrepair such that it cannot be rehabilitated for its intended purpose or other purposes including monitoring and observation;

B. "abate" or "abatement" means the investigation, containment, removal or other mitigation of **water pollution;**

C. "abatement plan" means a description of any operational, monitoring, contingency and closure requirements and conditions for the prevention, investigation and abatement of water pollution, and includes Stage 1, Stage 2, or Stage 1 and 2 of the abatement plan, as approved by the secretary;

D. "adjacent properties" means properties that are contiguous to the discharge site or property that would be contiguous to the discharge site but for being separated by a public or private right of way, including roads and highways.

E. "background" means, for purposes of ground-water abatement plans only and for no other purposes in this part or any other regulations including but not limited to surface-water standards, the amount of ground-water contaminants naturally occurring from undisturbed geologic sources or water contaminants which the responsible person establishes are occurring from a source other than the responsible person's facility; this definition shall not prevent the secretary from requiring abatement of commingled plumes of pollution, shall not prevent responsible persons from seeking contribution or other legal or equitable relief from other persons, and shall not preclude the secretary from exercising enforcement authority under any applicable statute, regulation or common law;

F. "casing" means pipe or tubing of appropriate material, diameter and weight used to support the sides of a well hole and thus prevent the walls from caving, to prevent loss of drilling mud into porous ground, or to prevent fluid from entering or leaving the well other than to or from the injection zone;

G. "cementing" means the operation whereby a cementing slurry is pumped into a drilled hole and/or forced behind the casing;

H. "cesspool" means a **"drywell"** that receives untreated domestic liquid waste containing human excreta, and which sometimes has an open bottom and/or perforated sides. A large capacity cesspool means a cesspool that receives greater than 2,000 gallons per day of untreated domestic liquid waste;

I. "collapse" means the structural failure of overlying materials caused by removal of underlying materials;

C. The standards are not intended as maximum ranges and concentrations for use, and nothing herein contained shall be construed as limiting the use of waters containing higher ranges and concentrations.
[2-18-77; 20.6.2.3101 NMAC - Rn, 20 NMAC 6.2.III.3101, 1-15-01]

20.6.2.3102: [RESERVED]
[12-1-95; 20.6.2.3102 NMAC - Rn, 20 NMAC 6.2.III.3102, 1-15-01]

20.6.2.3103 STANDARDS FOR GROUND WATER OF 10,000 mg/l TDS CONCENTRATION OR LESS: The following standards are the allowable pH range and the maximum allowable concentration in ground water for the contaminants specified unless the existing condition exceeds the standard or unless otherwise provided in Subsection D of Section 20.6.2.3109 NMAC. Regardless of whether there is one contaminant or more than one contaminant present in ground water, when an existing pH or concentration of any water contaminant exceeds the standard specified in Subsection A, B, or C of this section, the existing pH or concentration shall be the allowable limit, provided that the discharge at such concentrations will not result in concentrations at any place of withdrawal for present or reasonably foreseeable future use in excess of the standards of this section. These standards shall apply to the dissolved portion of the contaminants specified with a definition of dissolved being that given in the publication "*methods for chemical analysis of water and waste of the U.S. environmental protection agency*," with the exception that standards for mercury, organic compounds and non-aqueous phase liquids shall apply to the total unfiltered concentrations of the contaminants.

A. Human Health Standards-Ground water shall meet the standards of Subsection A and B of this section unless otherwise provided. If more than one water contaminant affecting human health is present, the toxic pollutant criteria as set forth in the definition of toxic pollutant in Section 20.6.2.1101 NMAC for the combination of contaminants, or the Human Health Standard of Subsection A of Section 20.6.2.3103 NMAC for each contaminant shall apply, whichever is more stringent. Non-aqueous phase liquid shall not be present floating atop of or immersed within ground water, as can be reasonably measured.

(1) Arsenic (As).....0.1 mg/l
(2) Barium (Ba).....1.0 mg/l
(3) Cadmium (Cd).....0.01 mg/l
(4) Chromium (Cr).....0.05 mg/l
(5) Cyanide (CN).....0.2 mg/l
(6) Fluoride (F).....1.6 mg/l
(7) Lead (Pb).....0.05 mg/l
(8) Total Mercury (Hg).....0.002 mg/l
(9) Nitrate (NO_3 as N).....10.0 mg/l
(10) Selenium (Se).....0.05 mg/l
(11) Silver (Ag).....0.05 mg/l
(12) Uranium (U).....0.03 mg/l
(13) Radioactivity: Combined Radium-226 & Radium-228.....30 pCi/l
(14) Benzene.....0.01 mg/l
(15) Polychlorinated biphenyls (PCB's).....0.001 mg/l
(16) Toluene.....0.75 mg/l
(17) Carbon Tetrachloride.....0.01 mg/l
(18) 1,2-dichloroethane (EDC).....0.01 mg/l
(19) 1,1-dichloroethylene (1,1-DCE).....0.005 mg/l
(20) 1,1,2,2-tetrachloroethylene (PCE).....0.02 mg/l
(21) 1,1,2-trichloroethylene (TCE).....0.1 mg/l
(22) ethylbenzene.....0.75 mg/l
(23) total xylenes.....0.62 mg/l
(24) methylene chloride.....0.1 mg/l
(25) chloroform.....0.1 mg/l
(26) 1,1-dichloroethane.....0.025 mg/l
(27) ethylene dibromide (EDB).....0.0001 mg/l
(28) 1,1,1-trichloroethane.....0.06 mg/l
(29) 1,1,2-trichloroethane.....0.01 mg/l
(30) 1,1,2,2-tetrachloroethane.....0.01 mg/l
(31) vinyl chloride.....0.001 mg/l

(32) PAHs: total naphthalene plus monomethylnaphthalenes.....0.03 mg/l
(33) benzo-a-pyrene.....0.0007 mg/l

B. Other Standards for Domestic Water Supply

(1) Chloride (Cl) .....250.0 mg/l
(2) Copper (Cu) .....1.0 mg/l
(3) Iron (Fe) .....1.0 mg/l
(4) Manganese (Mn) .....0.2 mg/l
(6) Phenols.....0.005 mg/l
(7) Sulfate (SO_4) .....600.0 mg/l
(8) Total Dissolved Solids (TDS) .....1000.0 mg/l
(9) Zinc (Zn) .....10.0 mg/l
(10) pH.....between 6 and 9

C. Standards for Irrigation Use - Ground water shall meet the standards of Subsection A, B, and C of this section unless otherwise provided.

(1) Aluminum (Al).....5.0 mg/l
(2) Boron (B) .....0.75 mg/l
(3) Cobalt (Co) .....0.05 mg/l
(4) Molybdenum (Mo) .....1.0 mg/l
(5) Nickel (Ni) .....0.2 mg/l

[2-18-77, 1-29-82, 11-17-83, 3-3-86, 12-1-95; 20.6.2.3103 NMAC - Rn, 20 NMAC 6.2.III.3103, 1-15-01; A, 9-26-04]

[Note: For purposes of application of the amended numeric uranium standard to past and current water discharges (as of 9-26-04), the new standard will not become effective until June 1, 2007. For any new water discharges, the uranium standard is effective 9-26-04.]

20.6.2.3104 DISCHARGE PERMIT REQUIRED: Unless otherwise provided by this Part, no person shall cause or allow effluent or leachate to discharge so that it may move directly of indirectly into ground water unless he is discharging pursuant to a discharge permit issued by the secretary. When a permit has been issued, discharges must be consistent with the terms and conditions of the permit. In the event of a transfer of the ownership, control, or possession of a facility for which a discharge permit is in effect, the transferee shall have authority to discharge under such permit, provided that the transferee has complied with Section 20.6.2.3111 NMAC, regarding transfers. [2-18-77, 12-24-87, 12-1-95; Rn & A, 20.6.2.3104 NMAC - 20 NMAC 6.2.III.3104, 1-15-01; A, 12-1-01]

20.6.2.3105 EXEMPTIONS FROM DISCHARGE PERMIT REQUIREMENT: Sections 20.6.2.3104 and 20.6.2.3106 NMAC do not apply to the following:

A. Effluent or leachate which conforms to all the listed numerical standards of Section 20.6.2.3103 NMAC and has a total nitrogen concentration of 10 mg/l or less, and does not contain any toxic pollutant. To determine conformance, samples may be taken by the agency before the effluent or leachate is discharged so that it may move directly or indirectly into ground water; provided that if the discharge is by seepage through non-natural or altered natural materials, the agency may take samples of the solution before or after seepage. If for any reason the agency does not have access to obtain the appropriate samples, this exemption shall not apply;

B. Effluent which is discharged from a sewerage system used only for disposal of household and other domestic waste which is designed to receive and which receives 2,000 gallons or less of liquid waste per day;

C. Water used for irrigated agriculture, for watering of lawns, trees, gardens or shrubs, or for irrigation for a period not to exceed five years for the revegetation of any disturbed land area, unless that water is received directly from any sewerage system;

D. Discharges resulting from the transport or storage of water diverted, provided that the water diverted has not had added to it after the point of diversion any effluent received from a sewerage system, that the source of the water diverted was not mine workings, and that the secretary has not determined that a hazard to public health may result;

E. Effluent which is discharged to a watercourse which is naturally perennial; discharges to dry arroyos and ephemeral streams are not exempt from the discharge permit requirement, except as otherwise provided in this section;

F. Those constituents which are subject to effective and enforceable effluent limitations in a National Pollutant Discharge Elimination System (NPDES) permit, where discharge onto or below the surface of the ground so that water contaminants may move directly or indirectly into ground water occurs downstream from the outfall

THE NEW MEXICO ENVIRONMENT DEPARTMENT

HEALTH ADVISORY FOR PRIVATE WELLS WITHIN THE SAN MATEO CREEK BASIN

Advisory

The New Mexico Environment Department ("NMED") cautions all present and future owners and users of private wells within the San Mateo Creek basin (see Figure 1) that your well water could contain some contaminant concentrations in excess of federal drinking water standards.

Possible contaminants that may occur in concentrations exceeding federal drinking water standards include chloride, gross alpha, lead, manganese, nitrate, pH, $radium_{226}$+$radium_{228}$, selenium, sulfate, total dissolved solids ("TDS"), and uranium; additional contaminants that have been detected for which federal drinking water standards have not been established include, iron, molybdenum, $thorium_{230}$, and vanadium. The sources of these contaminants in part may include naturally-occurring ore deposits within this portion of the "Grants uranium belt," as well as former uranium mines and mills within the basin that historically accessed these deposits.

Health risks for long-term exposure to gross alpha, lead, nitrate, radium, selenium, sulfate, thorium, and uranium contaminants that have been documented could include cancer; kidney, spleen, and liver damage; birth defects; systemic mineral imbalance; and digestive problems. Information regarding these contaminants in drinking water can be found at the U.S. Environmental Protection Agency (EPA) website, http://www.epa.gov/safewater/dwh/, and at the Agency for Toxic Substances and Disease Registry (ATSDR) website, http://www.atsdr.cdc.gov/toxfaq.html. Other contaminants listed above may cause only aesthetic effects to the appearance or taste of ground water.

Current and future private well owners and users are urged to have their well water sampled for concentrations of these contaminants. Persons who are considering installing a private well within the Advisory Area are urged to test well water for these contaminants. A list of certified laboratories for drinking water analyses can be found on the Internet at http://www.nmenv.state.nm.us/dwb/Certified_labs.html.

These recommendations only apply to private domestic wells. Public water supply systems for municipalities, and for some smaller communities such as some trailer parks, are regulated by the NMED Drinking Water Bureau and are routinely tested for regulated contaminant concentrations (*i.e.*, those for which EPA has established primary Maximum Contaminant Levels ["MCLs"]) to identify any exceedances of federal drinking water standards. Information on regulated drinking water supply systems can be found on the Internet at http://eidea.state.nm.us/SDWIS/.

NMED is also in the early stages of investigations within the San Mateo basin in order to better understand, and potentially address, possible ground water contamination from past uranium mining and milling activities.

Additional information

The majority of information about ground water quality, as well as most current human consumptive usage, comes from private wells in subdivisions that are located in the southern part of this basin, within Cibola County north of the City of Milan. Other areas of this basin are sparsely populated, and little current data on ground water quality exist outside of former uranium mine and mill sites.

Since the 1970's, the U.S. Nuclear Regulatory Commission ("NRC") has required remediation of ground water contamination at the Homestake Mining Company uranium millsite. Under NRC regulatory authority, background concentrations of site-related contaminants have been established for the affected aquifers, and accepted by NMED and EPA. These background levels generally exceed MCLs, indicating that ground water contamination in excess of federal drinking water standards also exists upgradient of the Homestake facility from contaminant sources other than the Homestake facility, including both natural (*e.g.*, ground or surface water passing through rocks from which naturally-occurring minerals become dissolved into the water), and potential manmade sources (*e.g.*, both ground or surface water passing through and dissolving components of mine or mill wastes, and ground water that has been impacted by mine or mill effluents). Homestake is required to remediate site-related contaminants to the approved background contaminant concentrations in the aquifers affected by contamination from its millsite. However, ground water background contaminant concentrations in excess of federal primary MCLs within the San Mateo Creek basin are expected to persist after Homestake completes its remedial activities.

Limited recent ground water quality data from samples that have been collected in and near abandoned uranium mine shafts in the Ambrosia Lake area also indicate the occurrence of contaminants in concentrations exceeding MCLs within this area of the basin.

ALL PRESENT AND FUTURE OWNERS AND USERS OF PRIVATE WELLS THAT ARE LOCATED WITHIN THE ADVISORY AREA ARE ADVISED TO SAMPLE THEIR WELLS TO ENSURE THAT THE QUALITY OF WELL WATER DOES NOT POSE HEALTH CONCERNS.

For more information about public water supply systems, please contact:

New Mexico Environment Department
Drinking Water Bureau
Toll Free: (877) 654-8720 (toll-free)
http://www.nmenv.state.nm.us/dwb/index.htm

For more information about ground water abatement activities, please contact:

New Mexico Environment Department
Ground Water Quality Bureau
(800) 219-6157
(505) 827-2918
http://www.nmenv.state.nm.us/gwb/gwqbhome.html

For more information about the potential health effects of ground water contaminants, please contact:

New Mexico Department of Health
Epidemiology and Response Division
(800) 879-3421 (toll-free)
(505) 827-0006
http://www.health.state.nm.us/index.html

Figure 1: Private well health advisory area—San Mateo Creek Basin